

FIG. 1a

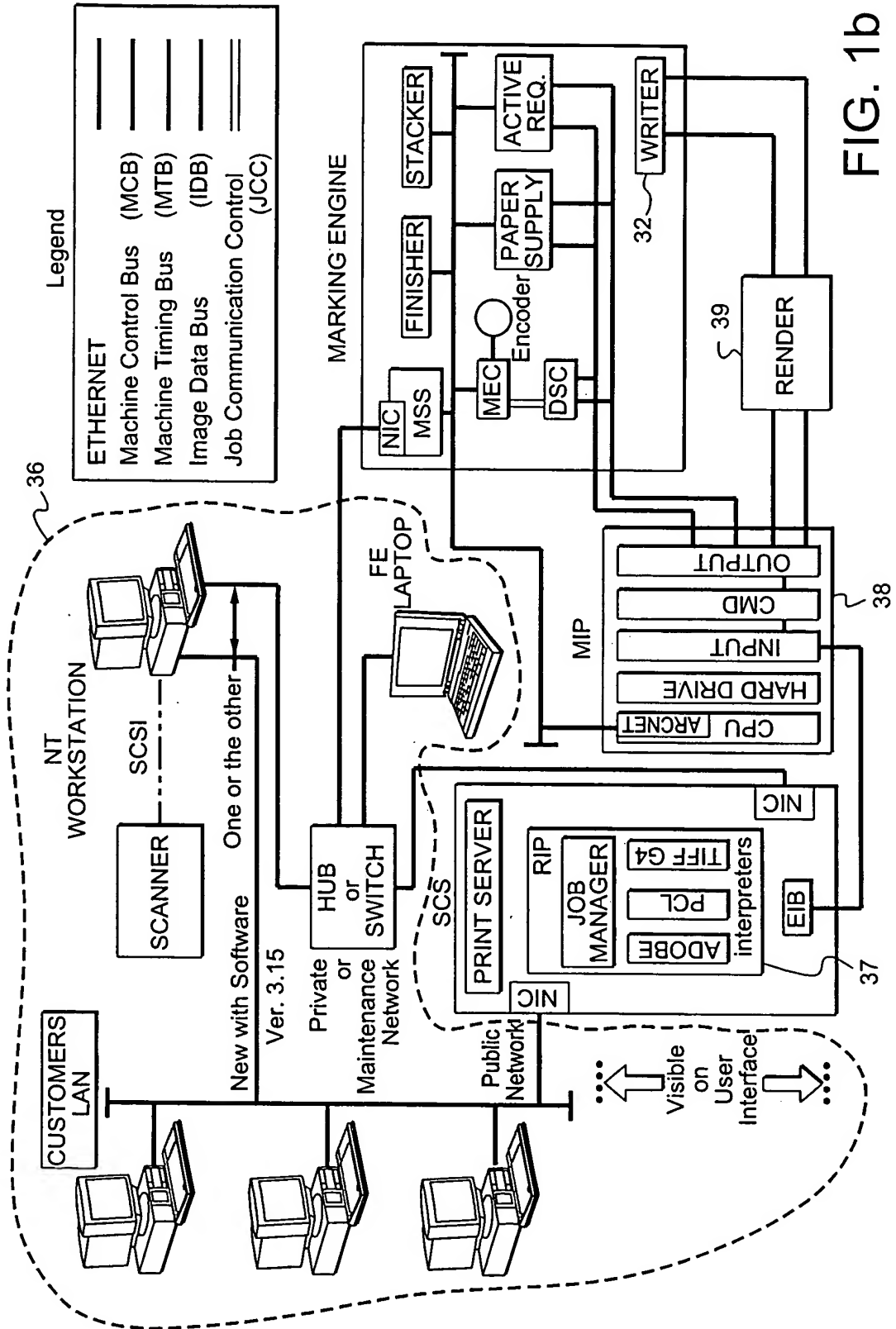


FIG. 1b

Algorithm Block Diagram

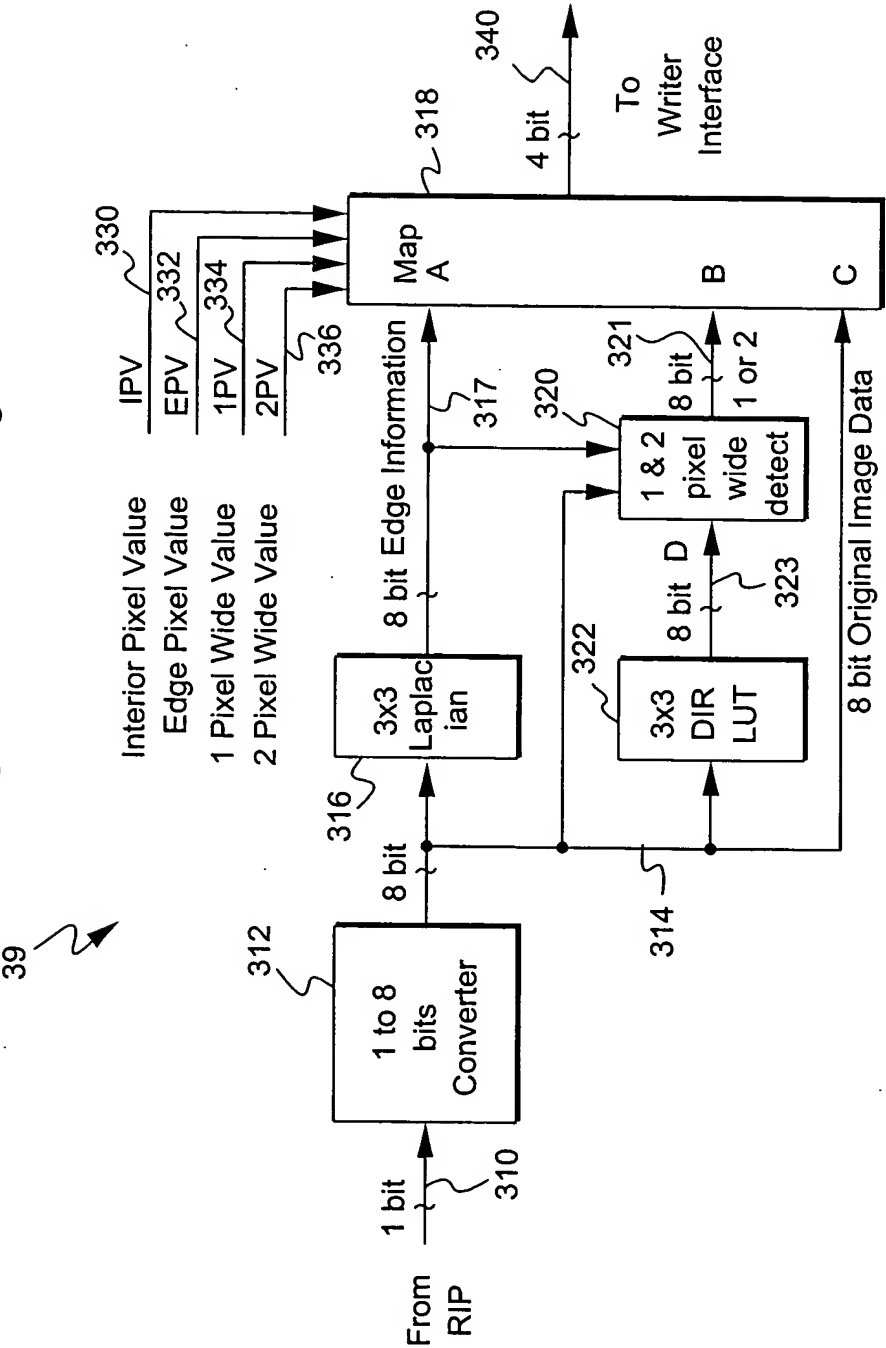


FIG. 2

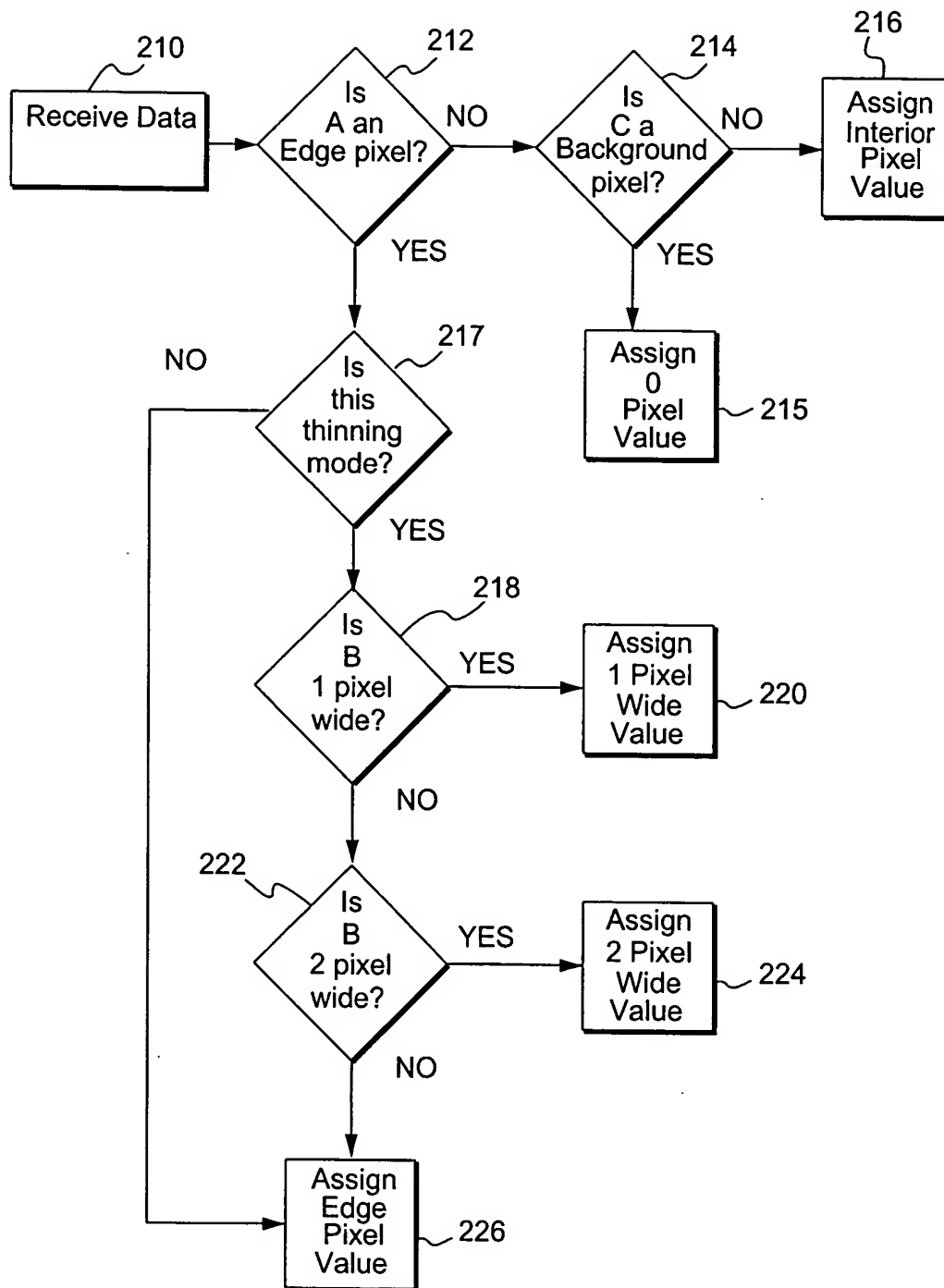
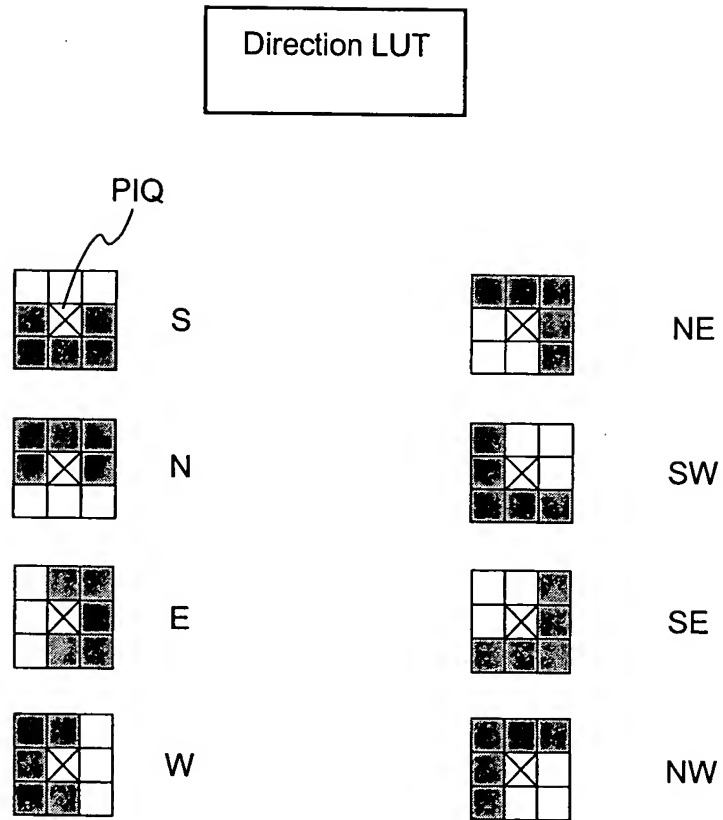
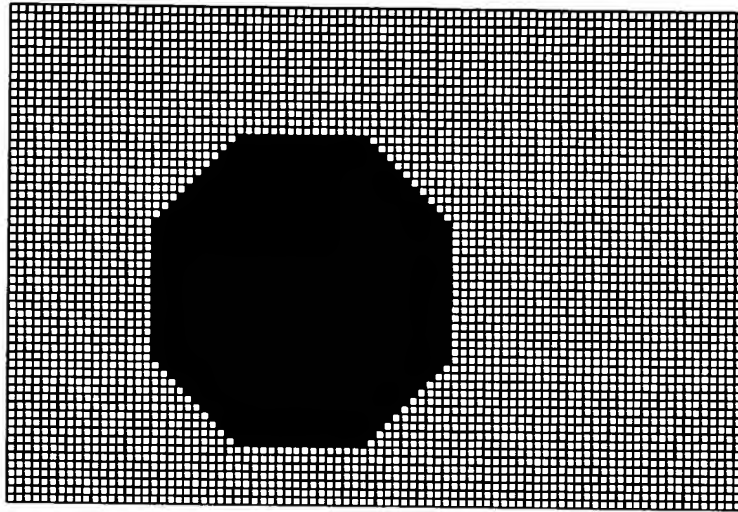


FIG. 3



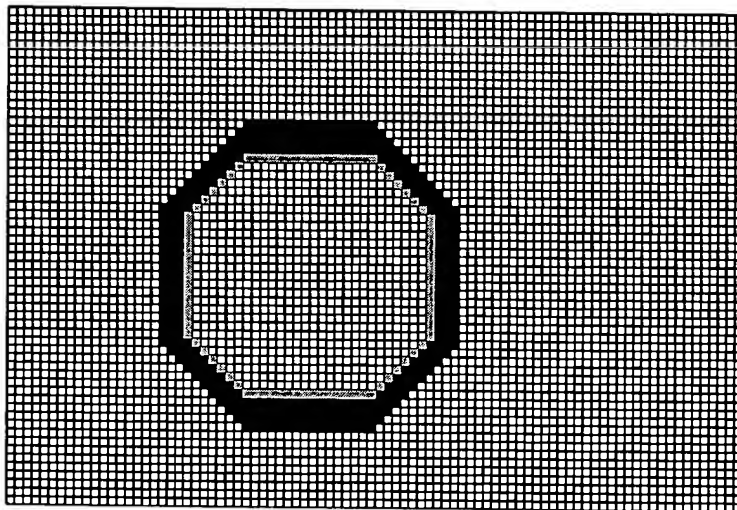
All other combinations result in zero.

FIG. 4



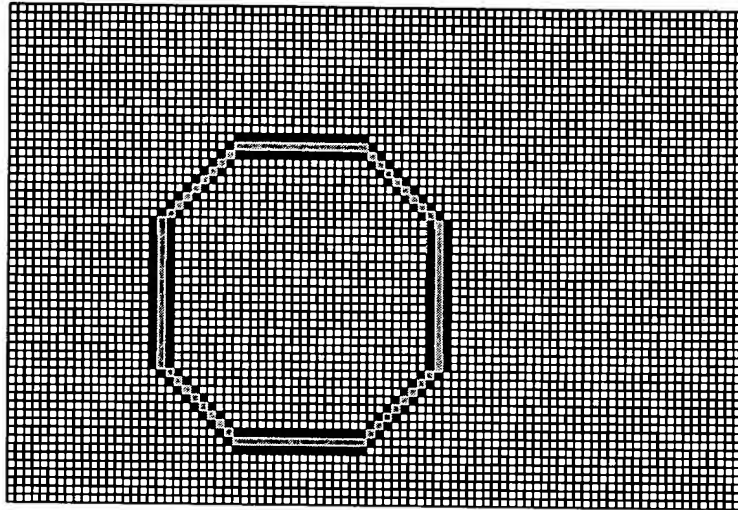
Original object
bitmap

FIG. 5a



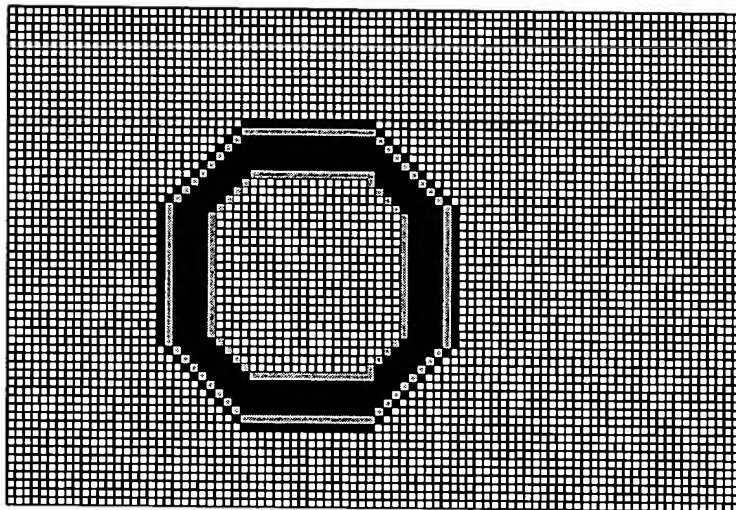
Four onion skin
layers when thinning

FIG. 5b



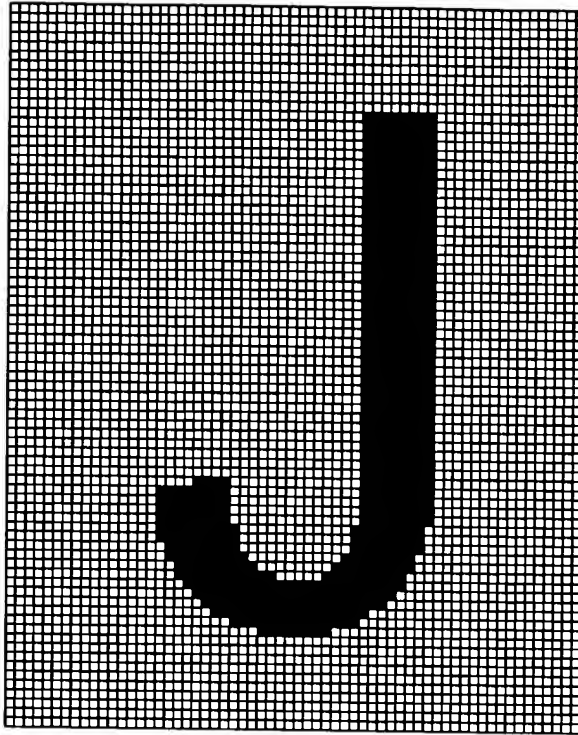
Three onion
skin layers when
thickening

FIG. 5c



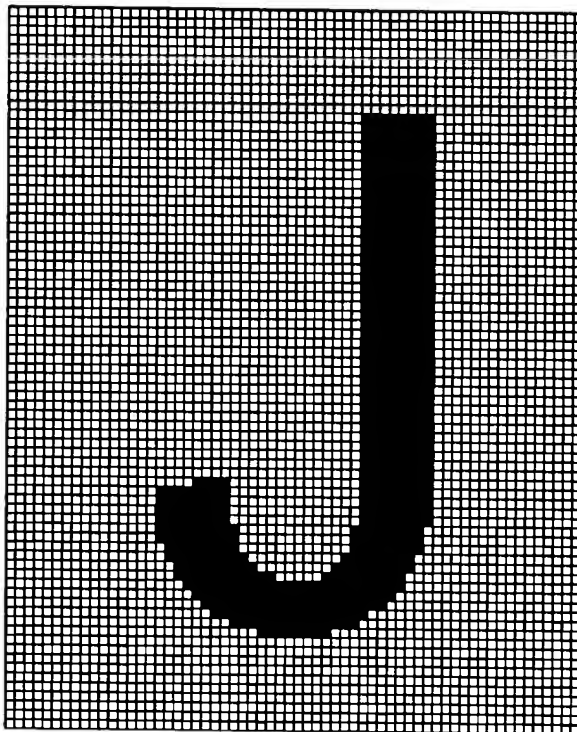
All layers
(thickening and
thinning)

FIG. 5d



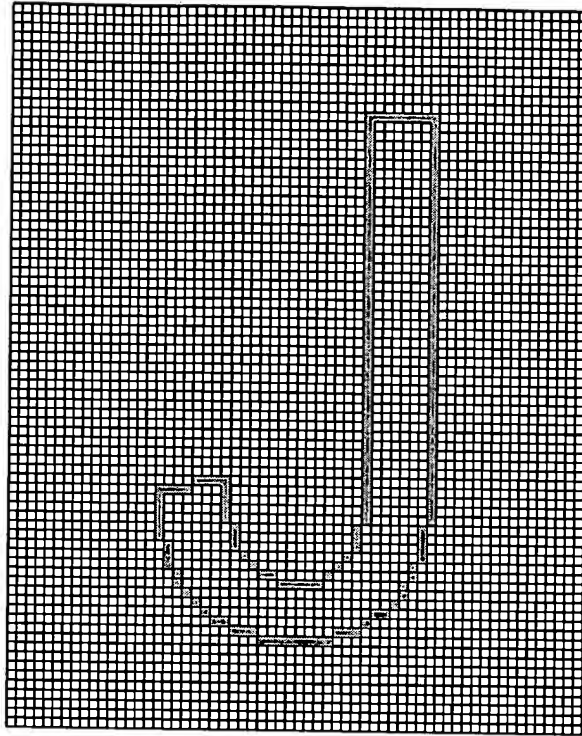
Original
Binary Bitmap

FIG. 6a



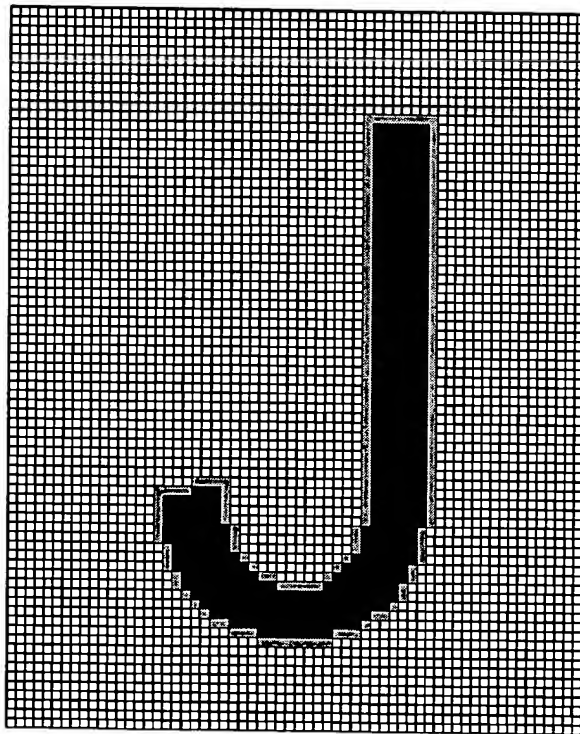
Same grey level pixel value
value assigned to edges
and solid area density

FIG. 6b



Edges
when thinning

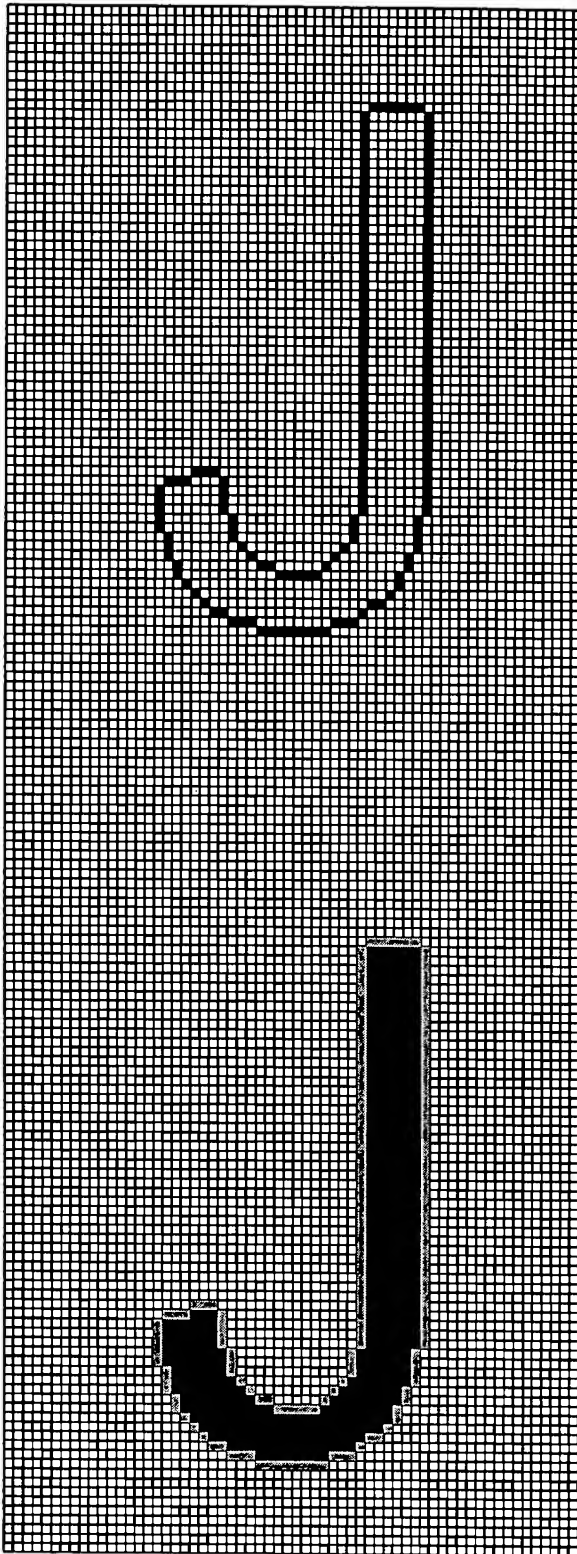
FIG. 6c



Lightened-
Solid area density reduced
Letter thinner

FIG. 6d

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Edges
when thickening

FIG. 6e

Thickened
Letter thickened by applying
gray to edges which were
originally white

FIG. 6f

1 Pixel Wide Detection

Original 1 pixel wide line

FIG. 7a

A 10x10 grid of squares. A vertical bar of 10 black squares is located in the center, spanning from the second column from the left to the third column from the left, and from the second row from the top to the ninth row from the top. This represents a 1D lattice with a defect.

0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	255	0	0	0
0	0	0	255	0	0	0
0	0	0	255	0	0	0
0	0	0	255	0	0	0
0	0	0	255	0	0	0
0	0	0	255	0	0	0
0	0	0	255	0	0	0
0	0	0	255	0	0	0
0	0	0	255	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Edge Pixels

FIG. 7b

0	0	0	0	0	0	0
0	0	SE	S	SW	0	0
0	0	E	S	W	0	0
0	0	E	0	W	0	0
0	0	E	0	W	0	0
0	0	E	0	W	0	0
0	0	E	0	W	0	0
0	0	E	0	W	0	0
0	0	E	0	W	0	0
0	0	E	0	W	0	0
0	0	E	N	W	0	0
0	0	NE	N	NW	0	0
0	0	0	0	0	0	0

Direction Values

FIG. 7c

BP	BP	BP	BP	BP	BP	BP
BP	BP	BP	BP	BP	BP	BP
BP	BP	BP	EP	BP	BP	BP
BP	BP	BP	1W	BP	BP	BP
BP	BP	BP	1W	BP	BP	BP
BP	BP	BP	1W	BP	BP	BP
BP	BP	BP	1W	BP	BP	BP
BP	BP	BP	1W	BP	BP	BP
BP	BP	BP	1W	BP	BP	BP
BP	BP	BP	1W	BP	BP	BP
BP	BP	BP	EP	BP	BP	BP
BP	BP	BP	BP	BP	BP	BP
BP	BP	BP	BP	BP	BP	BP

Assignment

BP: Background Pixel

EP: Edge Pixel

1W: One Pixel Wide Line

FIG. 7d

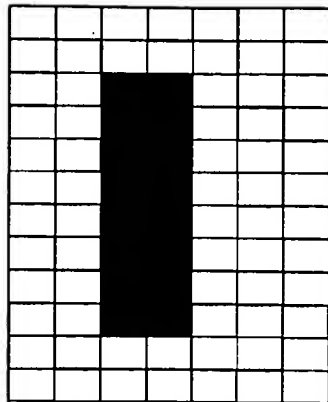


FIG. 8a

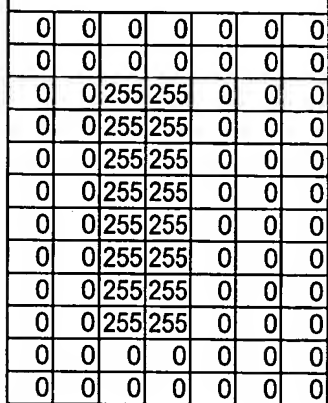


FIG. 8b

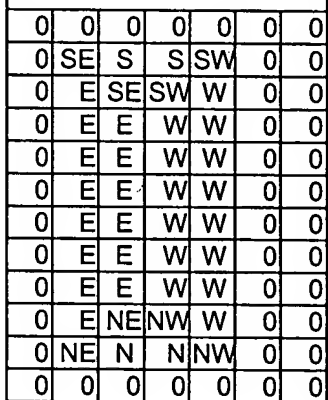


FIG. 8c



FIG. 8d

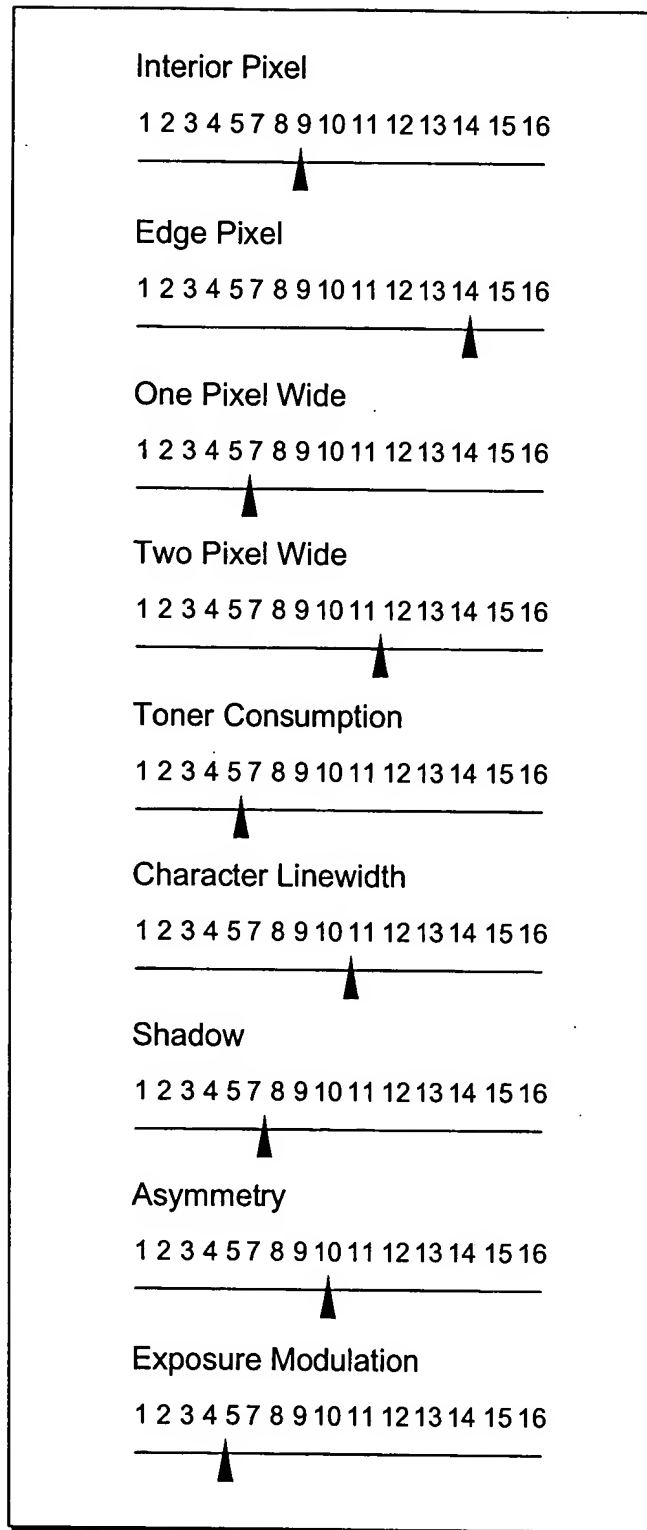


FIG. 9

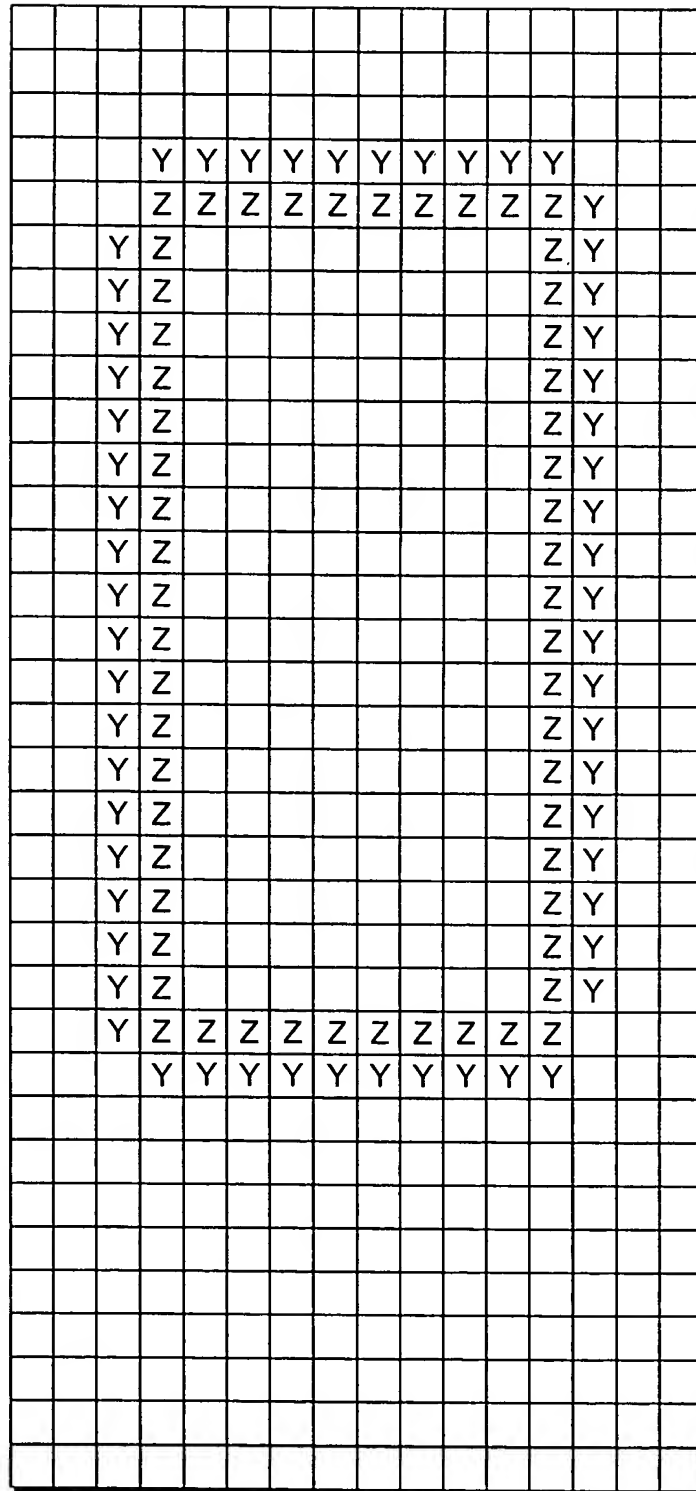


FIG. 10

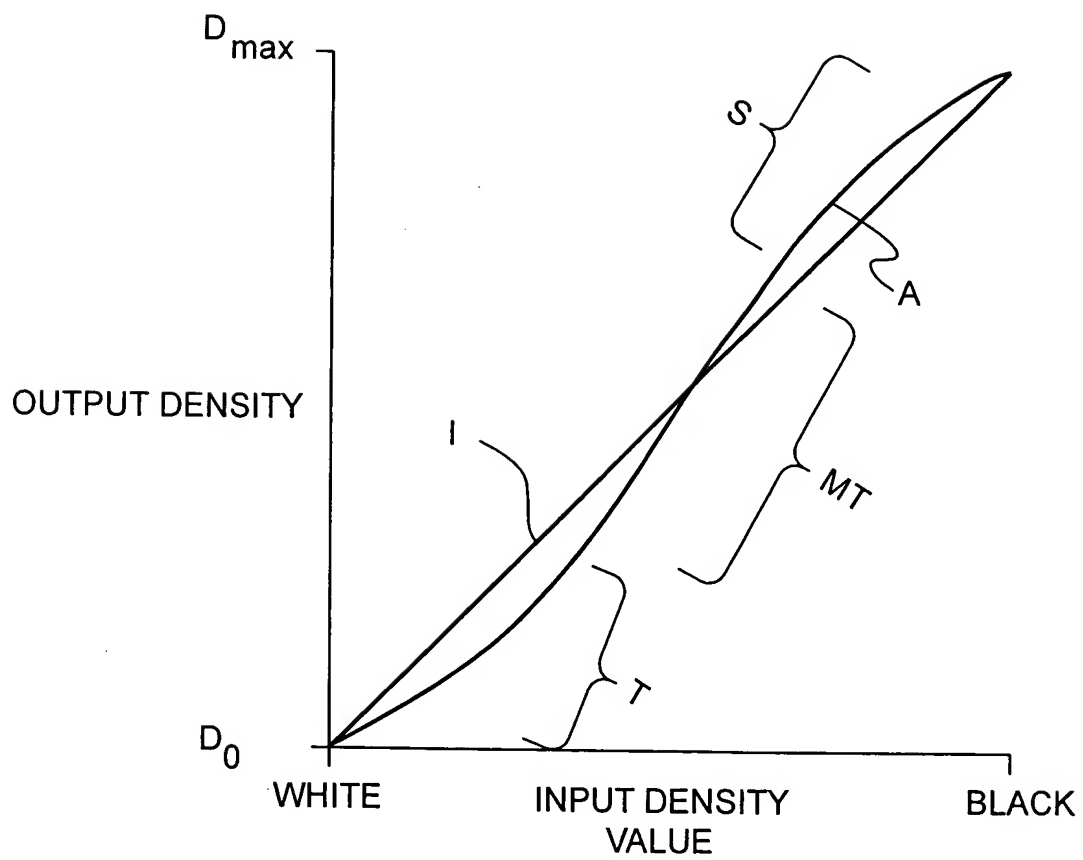


FIG. 11

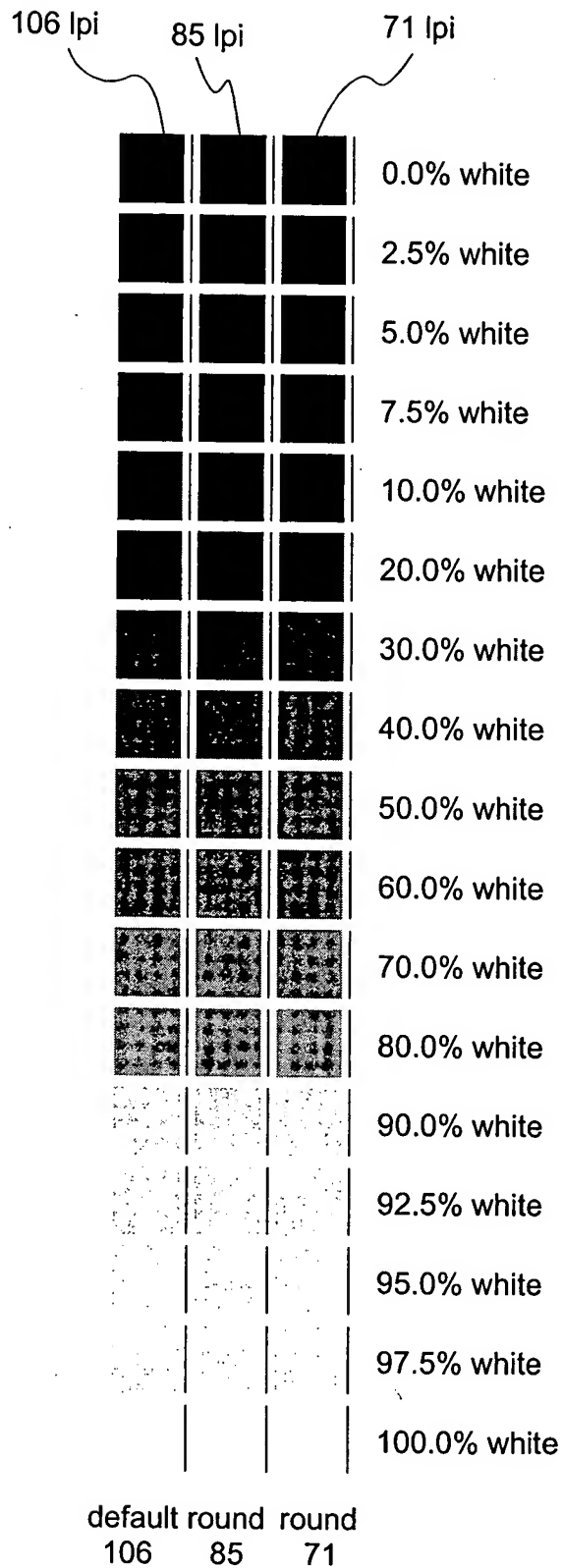


FIG. 12

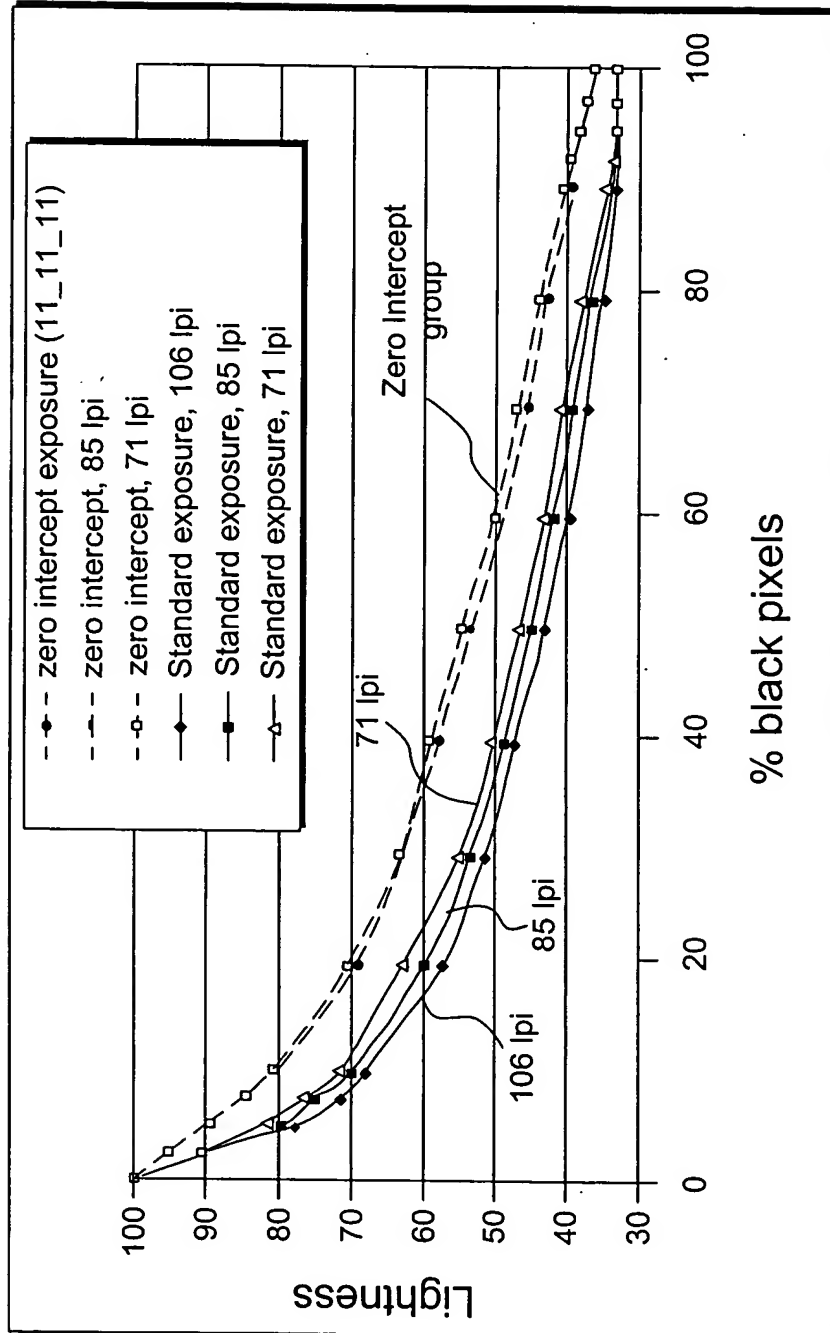


FIG. 13

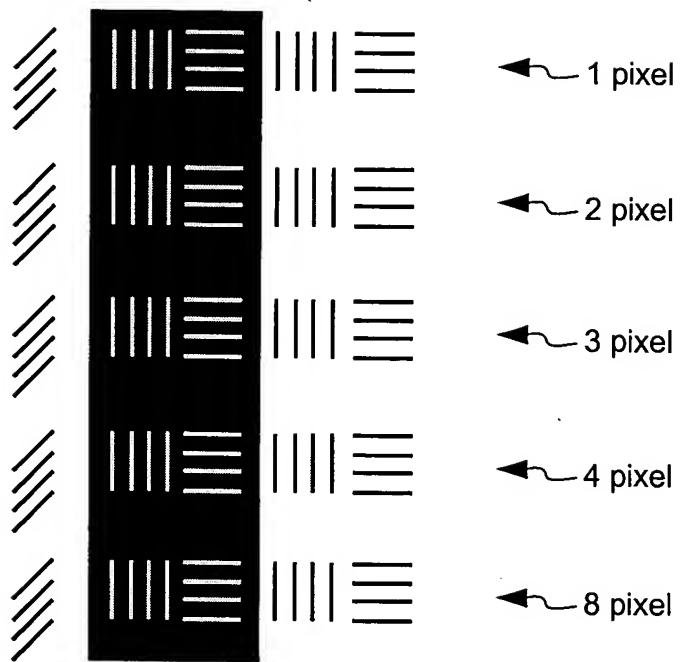


FIG. 14

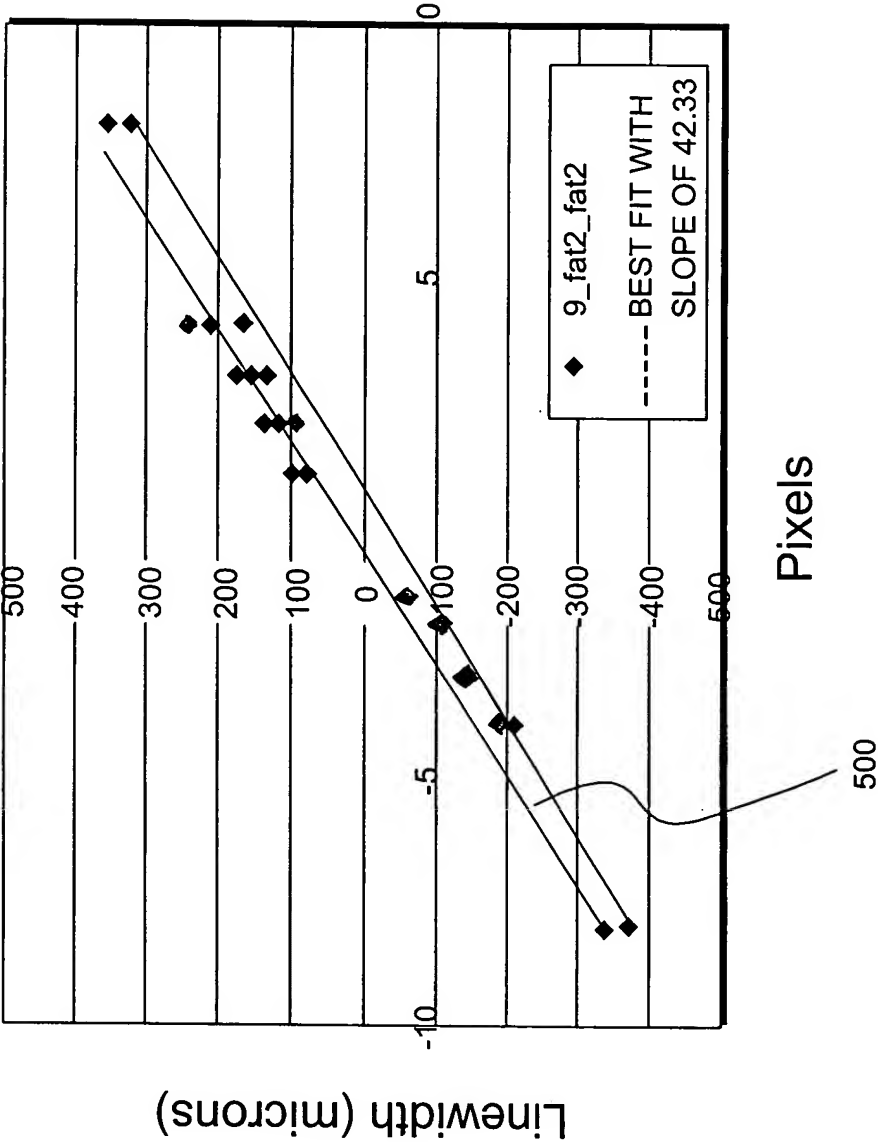


FIG. 15

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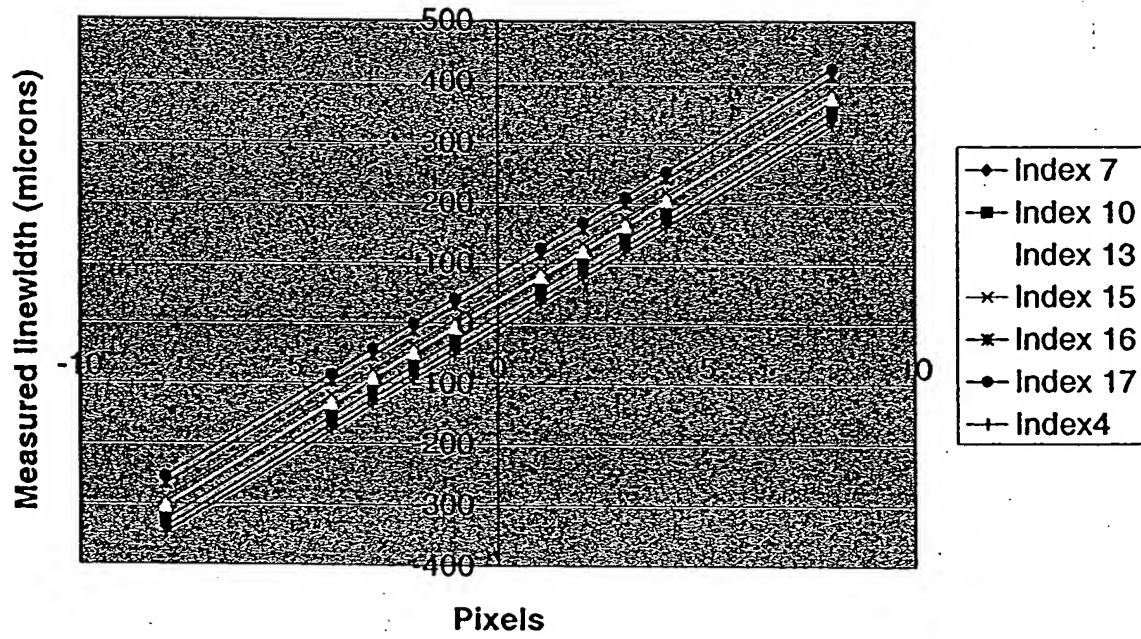


Fig. 16

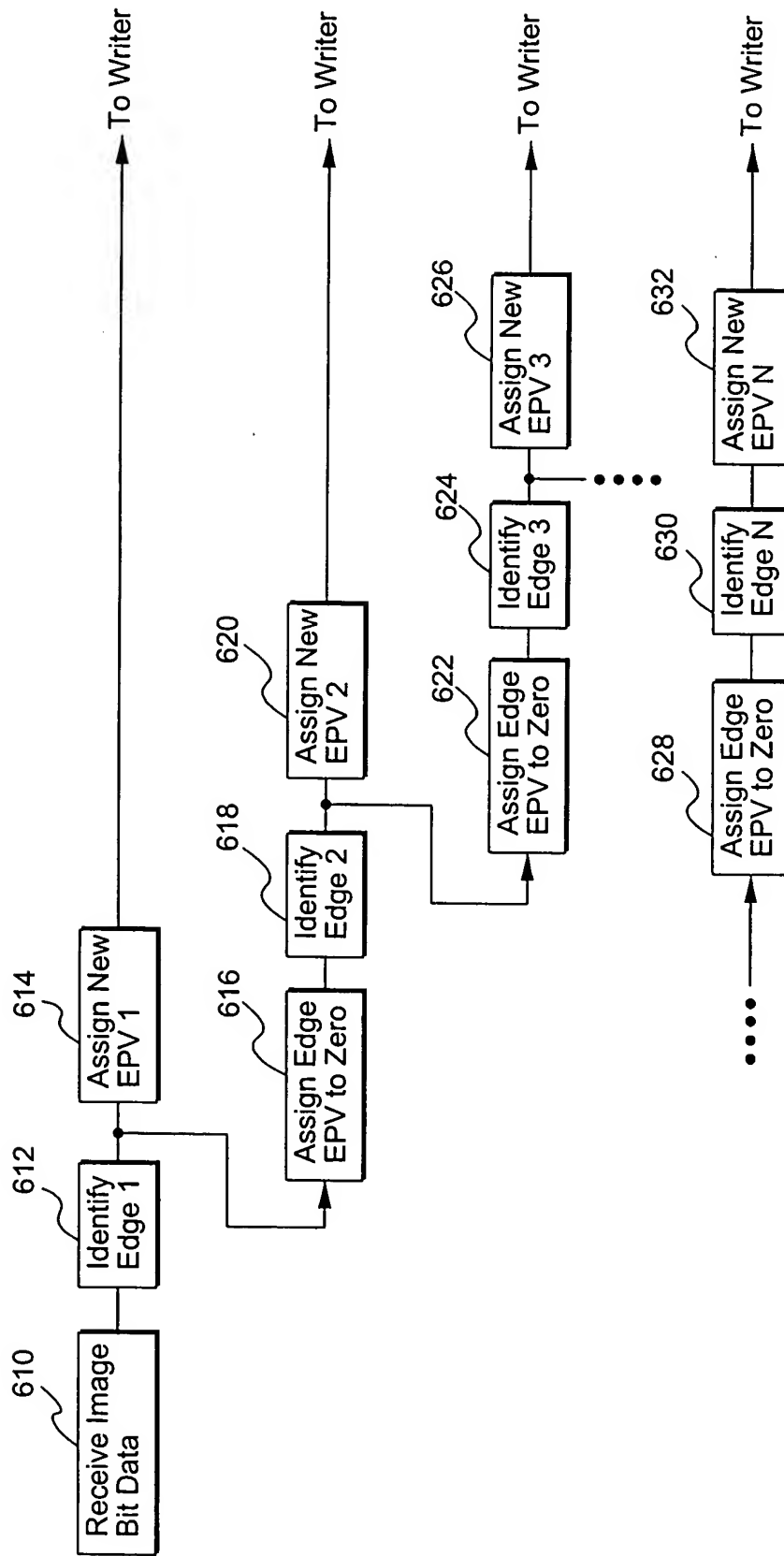


FIG. 17